

SERIOUS EYE INJURIES CAUSED BY THE CIVIL DISTURBANCES IN BELFAST

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INTRODUCTION

Trauma is the commonest cause of eye disease. In the five years up to August 1969, 376 perforating eye injuries were treated in the Eye & Ear Clinic, Royal Victoria Hospital, the main causes being accidents and play in children, and road traffic accidents in adults. Only twenty-one were due to assault, usually with the fist or broken glass, one was due to a butt with the head and one with the toe of a boot. Four were due to explosions—two exploding cartridges, one firework and one detonator. These four eyes were lost or rendered sightless. Three eyes were lost due to accidental shotgun injuries, and two were lost when hit by air gun pellets.

In contrast, in the year from the 15th August, 1969 till August, 1970, sixteen cases were seriously injured in the civil riots and treated in the Eye & Ear Clinic. Nine were hit by shotgun pellets, three by bullets and four by other missiles or blows. These injuries occurred in rioting on four separate occasions: 13th, 14th and 15th August 1969 in West Belfast; 11th and 12th October 1969 on Shankill Road; 2nd April 1970 at Ballymurphy; 27th and 28th June 1970 in Springfield and Lower Falls areas.

It is proposed to describe the injuries and their consequences which took place on the above dates. Excluded are numerous minor contusions, lid injuries, trauma due to chemical burns such as C.S. gas and acid.

CASE HISTORIES

The first ten cases were injured on the 14th and 15th August when the initial rioting was taking place in West Belfast. Cases 11–13 were injured on 11th and 12th October, 1969, Case 14 on 2nd April, 1970 at Ballymurphy and Cases 15–16 on 27th and 28th June, 1970 at Springfield and Lower Falls area. For various reasons a detailed history is not given and follow-up was difficult.

Case 1. Age 24. Admitted 15.8.69.

Right perforating eye injury caused by stone or piece of pavement. A corneal wound with iris prolapse was present which was repaired surgically under general anaesthetic the same day. Grit was removed from the wound but no intraocular foreign body was present. Post operative course was uneventful and he was discharged on 29.8.69 when right visual acuity (R.V.A.) was $\frac{6}{60}$ and left visual acuity (L.V.A.) $\frac{6}{6}$.

Follow-up: Last seen 31.12.69. R.V.A. – $\frac{6}{12}$. The eye was well healed except for developing traumatic cataract.

Case 2. Age 15. Admitted 15.8.69.

Shotgun injury, multiple pellets to legs, trunk, chest and face. Right periorbital haematoma, globe intact. Right eye lower half field loss, defective abduction and

elevation. Corneal reflex present. Pupillary reactions normal. Mediae and fundi normal. X-ray: Pellet in right orbit behind globe affecting 2nd, 3rd and 6th cranial nerves. Elevation of eye restored. Discharged 25.8.69. Pellets later removed from forehead, chin and right shoulder.

Follow-up: 2.10.69 R.V.A. - $\frac{6}{6}$. Lower field loss. Optic atrophy and defective abduction present.

Case 3. Age 50. Admitted 15.8.69.

Shotgun injury, multiple pellet scatter, four pellets were found in chest—two anterior to manubrium sterni and two in right lung tissue giving rise to small apical pneumothorax and haemothorax. Five pellets were found in the region of left elbow. Skull—one in left frontal sinus, one in right orbit—extraocular. Pellets in region of left infraorbital margin and right ear and two on either side of mandible. Right perforating eye injury at limbus with vitreous loss. The vitreous was full of blood. This was repaired surgically the same day under G.A. On 26.8.69 a shotgun pellet worked its way to the surface under the conjunctiva in the lower fornix of the right eye and was removed. Discharged 27.8.69.

Follow-up: 9.10.69. R.V.A.—Hand movements. Blood still in vitreous and retinal detachment present. L.V.A. $\frac{6}{18}$. Blood in vitreous. Traumatic choroido-retinal scarring below.

Case 4. Age 37. Shotgun injury 15.8.69 admitted from Mater Hospital 16.8.69.

Scleral perforating wound left eye with vitreous loss. X-ray showed pellet outside and behind globe, above the optic nerve at apex of orbit. Scleral wound repaired 16.8.69. Discharged 28.8.69.

Follow-up: 5.1.70. R.V.A. - $\frac{6}{6}$. L.V.A. - Hand movements, vitreous haemorrhage and detachment.

Case 5. Age 27. Shotgun injury 15.8.69 admitted from Mater Hospital 16.8.69.

Pellets were found in the left side of chest, left arm and shoulder, left side of face and left ear. A fairly large fragment was found in the outer wall right orbit—extraocular. Pellet in upper maxilla below orbit right side, two small fragments in outer wall of left antrum, scleral perforating wound left eye, vitreous haemorrhage. The scleral wound was repaired 16.8.69. Discharged 29.8.69.

Follow-up: 6.10.69. R.V.A. - $\frac{6}{4}$. L.V.A. - No light perception, total detachment of retina.

Case 6. Age 43. Shotgun injury 15.8.69.

Multiple pellets were found in chest and right forearm. The right eye was intact. Left eye: no light perception, no entrance wound found but lead pellet (?) seen in vitreous. Difficult to see because of haemorrhage. Oedema and haemorrhage of retina below. The X-ray report stated that the pellet in left orbit was outside globe, behind and below. Treatment was conservative. Discharged 28.8.69. Pellets removed from left scalp, right clavicular region and right elbow under local anaesthetic 30.9.69. The patient was re-admitted 3.3.70 with a blind painful eye. Large hyphaema. 4.3.70 eye enucleated and sent for pathological report.

Pathological Report: (Institute of Ophthalmology, London). Shotgun pellet

present intraocularly lying posteronasally, hyphaema. No definite entrance wound found. Total detachment of retina with haemorrhage in sub-retinal space and vitreous.

Case 7. Age 13. Shotgun injury 15.8.69.

Hit by fine pellet scatter mainly on left side of face. Three deep corneal foreign bodies were present in left cornea. X-rays showed multiple small fragments projected on the left parietal region, one lying in the medial aspect of the left orbit extraocularly. The foreign bodies were removed from the cornea and left side of face under general anaesthetic on 15.8.69. They were non-magnetic, smaller than the usual shotgun pellets, rather like fine buck shot. Discharged 25.8.69.

Follow-up: 17.11.69. Right and left visual acuities – $\frac{6}{6}$. Fine corneal scarring was present. The eyes were otherwise normal.

Case 8. Age 17. Shotgun injury 15.8.69.

Multiple shotgun wounds on face, three over chin and five in left malar region.

Orbits: Pellet immediately behind right eye in region of optic nerve. Another pellet in nasal part of left orbit extraocularly.

Right eye: Conjunctival wound above cornea, no perforation found, hyphaema and vitreous haemorrhage.

Left eye: Globe collapsed, limbal perforation at 10.00 o'clock with iris, ciliary body and vitreous prolapse. Hyphaema.

A surgical repair of left eye was carried out on 15.8.69 and an excision of the prolapsed tissue. Post-operatively, there was no perception of light in either eye which had fixed dilated pupils. Vitreous haemorrhage precluded any fundus examination. Discharged 14.9.69.

Case 9. Age 50. Injured 15.8.69.

Unconscious, identity unknown for four days. Comminuted fracture right mandible, blow out fracture left orbital floor, facial lacerations. Left perforating eye injury. The globe was collapsed and damaged beyond repair. On 15.8.69 the left eye was eviscerated and the right mandible was reduced and wired. The right eye was undamaged. Discharged for convalescence 31.8.69.

Case 10. Age 56. Shotgun injury 15.8.69.

Multiple pellets in anterior surface of chest and abdomen, eight pellets in face. One pellet localised medial to the eye in left orbit. R.V.A. – $\frac{6}{9}$ L.V.A. $\frac{6}{18}$ Left traumatic iritis present, extensive preretinal and vitreous haemorrhage. Treatment conservative. Discharged 28.8.69.

Follow-up: 19.2.70. R.V.A. – $\frac{6}{9}$ L.V.A. – $\frac{6}{9}$ Still a little vitreous haemorrhage present. Fundus appeared normal.

Case 11. Age 22. Shotgun injury 11.10.69.

Admitted 12.10.69 Ward 21, unconscious. Numerous punctate facial wounds, large stellate laceration left parietal region through which a little brain tissue exuded. Left eye was collapsed and irreparably damaged. Skull wounds repaired 12.10.69. Entry wound and scleral wound repaired left eye and iris prolapse excised. Three sub-conjunctival foreign bodies were removed right eye. 30.10.69

left eye enucleated. No perception of light and danger of sympathetic ophthalmia.
Post-operatively: R.V.A. – $\frac{6}{6}$ Weakness right arm and leg and dysphasia.

Case 12. Age 20. Gunshot injury 12.10.69.

Pellets in left lower lid and left orbit extraocularly. Two pellets in throat which were removed on 12.10.69. Pellets removed from left lower lid under general anaesthetic on 16.10.69.

Follow-up: Vision and visual fields normal.

Case 13. Age 18. Gunshot injury 12.10.69.

Pellets in ethmoidal air cells, medial $\frac{1}{3}$ right supraorbital margin and small fragment in right orbit extraocularly. Pellets removed from right supraorbital margin under G.A. on 16.10.69.

Follow-up: Fields and vision normal but choroido-retinal scarring right eye at 10.00 o'clock in the periphery of the fundus.

Case 14. Age 30. Hit by brick right eye 2.4.70.

Admitted 3.4.70. Perforating injury right globe which was collapsed. Prolapse of iris tissue, vitreous and lens. Corneal tissue lost. The eye was damaged beyond repair. Evisceration of right eye carried out 3.4.70.

Case 15. Age 45. Admitted 27.6.70.

Left eye hit by flying missile on the Springfield Road. R.V.A. – $\frac{6}{6}$ L.V.A. – Hand movements. Two full thickness lacerations left upper lid, one full thickness laceration left lower lid, corneal abrasion, small hyphaema, lens subluxated down and laterally with vitreous in the anterior chamber. Intraocular tension normal. Lids sutured under local anaesthetic 27.6.70. Discharged 9.7.70.

Follow-up: Secondary glaucoma left eye with intraocular tension 50 mm Hg (normal 20 mm Hg). Controlled with oral Diamox. Lens has since become cataractous. Scarring of retina in macular area, L.V.A. – Hand movements – not improved. Successful lens extraction 9.9.70.

Case 16. Age 45.

No history, possibly hit by sniper's bullet on 28.6.70 Torn right pinna, fracture right parietal bone, zygoma and inferior orbital margin, medial wall of antrum and ascending ramus of right mandible, right lids torn away and eyeball exposed. Surgical repair carried out on 28.6.70 under general anaesthetic 6.7.70. R.V.A. – no perception of light. Left eye normal. Right VIIIth nerve palsy, ptosis, flattening of medial canthus, proptosis of eye, limitation of abduction, fixed dilated pupil, mediae clear, avulsion of optic nerve – haemorrhage and oedema around disc. Median tarsorrhophy carried out to prevent exposure keratitis.

DISCUSSION

Sixteen patients, of whom fourteen were civilians and two were soldiers, received eye injuries. Nineteen eyes were involved, eight right eyes and eleven left eyes. Gunshot injuries accounted for fifteen out of nineteen eyes injured. Case 16, which may have been due to a bullet, is included in this number.

Six were perforating injuries and in four there must have been a double perfora-

tion (cases 3, 4, 5 and left eye in case 8). This is assumed because the entrance wound was repaired and the X-ray localisation showed the foreign bodies to be lying extraocularly. In Case 3 the pellet worked its way to the surface and was later removed. In Case 6 there was a retained intraocular foreign body. This was suspected clinically but X-ray reported it was extraocular and only the pathology report confirmed that it was indeed intraocular. In these six cases the visual result was very poor, two eyes being removed and in the remaining four the visual acuity was hand movements or worse. This was due to the great disruptive force of a large foreign body passing through a small organ, causing much haemorrhage and retinal detachment. In Case 6 where the eye was ultimately removed with a retained intraocular foreign body, total detachment was present. There was a recurrent haemorrhage causing secondary glaucoma.

Apart from the precious metals, gold and platinum, and glass and plastic, lead is perhaps the most inert of the metals which commonly form intraocular foreign bodies. It is rapidly covered with a layer of insoluble carbonate which prevents diffusion and any chemical reactivity.

In no cases was infection a problem. Shotgun pellets are probably self-sterilising but all cases were given immediate local antibiotic cover—sub-conjunctival injection of Soframycin 500 mgm, and systemic antibiotics for up to a week.

Nine non-perforating injuries were caused by shotgun blast or bullets. These may be divided into three groups. The first (Cases 7 and 12) suffered no permanent visual loss. In the two eyes of Case 7, the smaller size of the shot did not penetrate the cornea and in Case 12, only the lids were affected.

In the second group of three eyes (Cases 3 (left eye), 10 and 13) pellets penetrated the orbit extraocularly and caused intraocular haemorrhage in two and choroido-retinal scarring in all three. In severe contusion, injuries of the globe commotio-retinae—that is oedema and haemorrhage resulting in choroido-retinal scarring, is common. The damage is indirect resulting from a contre-coup type of injury. Direct choroido-retinal damage from extraocular causes is rare except with very severe injury such as gunshot wounds. In two of these cases the visual acuity was reduced to $\frac{6}{18}$ and in the other case it was normal.

In the third non-perforating group of three eyes (Cases 2 (right eye), 8 and 16) the optic nerve was involved. In the latter two cases the whole nerve appeared to have been directly traumatised, causing immediate and total loss of vision. This was confirmed ophthalmoscopically in Case 16. In Case 2, only partial damage to the optic nerve resulted causing an inferior altitudinal field loss. This may be explained anatomically. The subarachnoid space is virtually absent in its upper part near the apex of the orbit where the nerve can be considered as attached to its dural sheath in the optic canal. This makes the upper part of the nerve in this region peculiarly susceptible to such damage because of its immobility, a circumstance which may account for the frequency of the occurrence of visual defects in the lower visual field.

Of the four injuries not caused by gunshot, two eyes (Cases 9 and 14) were damaged beyond repair and removed. The other two showed typical complications following severe contusion injury. In Case 1 a posterior subcapsular cataract of the concussion type is developing in the right eye. In Case 15 a subluxated cataractous lens resulted from a direct blow on the front of the eye caused by a flying

missile. Only very occasionally do these eyes remain quiet. Usually they develop cataract, a violent irritative iridocyclitis and secondary glaucoma. Glaucoma has occurred in this case but can be controlled by oral Diamox. Lens extraction is hazardous due to the likely effect of vitreous loss. In this case the prognosis for sight must be guarded as scarring involving the macula is present.

It can be seen that the most common injury was due to shotgun pellets—twelve out of nineteen eyes. These cases were in hospital an average of fifteen days and the prognosis on the whole was very poor. Nine eyes had severe visual loss or were lost. This compares very unfavourably with non-ocular shotgun injuries.

During the period August—October 1969 a total of thirty-five shotgun injuries were admitted to the Royal Victoria Hospital. Two hit at short range died, seven required general anaesthesia, being in hospital on average fourteen days, although their injuries were not serious. Twenty-six required no surgery or had very minor procedures, being in hospital on average three days. This means that beyond a certain range, death is unlikely to result from a shot-gun discharge. Because of the great scatter most injuries are trivial, unless the eyes are involved, when the result is very often blindness.

All these cases had periorbital oedema and ecchymosis, sub-conjunctival haemorrhage and chemosis in the affected eyes. Eight cases (2, 3, 4, 5, 6, 7, 8 and 15) were given bromelein—trade name Ananase—Tabs. II q.i.d. until the oedema and haemorrhage was no longer present. Bromelein is a concentrate of proteolytic enzymes from the pineapple plant (Seltzer, 1962). The other eight cases had no specific anti-oedematous agent. In the group on bromelein, all the periorbital and conjunctival oedema and ecchymosis had cleared by the 2nd or 3rd day after commencing treatment. In the untreated group, none cleared in under a week, some having signs for over two weeks.

SUMMARY

Sixteen cases, which included nineteen affected eyes injured in the civil disturbances in Belfast, are described. Fourteen were civilians and two were soldiers. Fifteen eyes received gunshot injuries and both those with perforating injuries and those with intraorbital but extraocular pellets had very poor visual results. The poor prognosis compared with non-ocular shotgun injuries is stressed. Four eyes suffered contusion injuries. Two with ruptured globes were excised, and two with complications resulted in poor visual acuity.

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